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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Franz-Josef Stark

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EXAMINER

BAREFORD, KATHERINE A

ART UNIT

PAPER NUMBER

1792

NOTIFICATION DATE

DELIVERY MODE

10/02/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

uspatents@senniger.com

Office Action Summary	Application No. 10/678,601	Applicant(s) STARK ET AL.	
	Examiner Katherine A. Bareford	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 48,49,52,53,59,61 and 66-69 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 48,49,52,53,59,61 and 66-69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☒ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/27/08</u> . | 6) ☐ Other: _____ |

DETAILED ACTION

1. The amendment filed July 9, 2008 (in response to the Notice of Non-compliant Amendment of July 3, 2008), and the Remarks filed with the amendment of May 12, 2008 (as well as the declaration filed May 12, 2008) have been received and considered. With the entry of the July 9, 2008 amendment to the claims, claims 1-47, 50-51, 54-58, 60 and 62-65 have been canceled, and claims 48, 49, 52, 53, 59, 61, 66 and new claims 67-69 are pending for examination.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. The rejection of claims 48, 49, 52, 53, 59, 61 and 66 under 35 U.S.C. 103(a) as being unpatentable over GB 1 243 134 (hereinafter '134) in view of Martyak et al (US 5258061) and Zhong et al (US 6106927) is withdrawn due to applicant's amendment of July 9, 2008 amending the requirement as to the stabilizer in claim 48.

5. Claims 48, 49, 52, 53, 59, 61, 66, 68 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harbulak et al (US 4483711) in view of GB 1 243 134 (hereinafter '134) and Parker et al (US 3887732).

Harbulak teaches a method for electroless deposition of nickel layers. Column 2, lines 45-60. Deposition is from an electrolyte solution. Column 3, lines 1-10. The electrolyte can comprise a nickel metal base salt (such as nickel acetate, column 4, lines 30-40), a reducing agent (such as sodium hypophosphite, column 4, lines 35-45), an accelerator (the sulfonium betaine compound, column 2, lines 50-55 and column 3, lines 5-25), and a stabilizer (column 3, lines 40-50). The electrolyte further comprises a complexing agent. Column 4, line 50 through column 5, line 10. The complexing agent can be lactic acid (2-hydroxypropanoic acid). Column 5, lines 5-10. During electroless deposition the electrolyte can be buffered to a range of 4.3 to 5.2 using an alkaline buffering agent. Column 3, lines 35-40 and column 4, lines 10-30. The nickel base metal salt can be added such that nickel is provided in a range of 1 to 15 g/l. Column 4, lines

30-40. Deposition rate of the nickel can be at 0.50 mil/hr, for example (approx. 12.7 microns/hr). Column 9, lines 60-65. As to the throughput, Harbulak teaches that bath turnover amount can be more than 8 turnovers, and provides no upper limit on the amount of turnovers. Column 9, lines 30-65. As to other optional materials, Harbulak provides that phosphorous, for example, can be deposited. Column 2, lines 55-60. As to the stabilizer, Harbulak teaches that the stabilizer can desirably be a metal salt of lead, tin, bismuth or zinc with an anion of acetate, for example. See column 6, lines 10-20.

Claim 49: the nickel metal base salt can be nickel acetate. Column 4, lines 30-35.

Claims 52-53: Harbulak teaches that during deposition makeup solutions of the constituents can be added to the bath to replenish the bath. Column 7, lines 5-15 and column 9, lines 35-50.

Claim 59: the reducing agent can be sodium hypophosphite. Column 4, lines 35-45.

Claim 61: the complexing agent concentration can be 15-200 g/l. column 4, lines 64-68.

Claim 66: as the amount of nickel can be 1 to 15 g/l and at least 8 turnovers can occur the amount of nickel throughput can be at least 8 to 120 g/l (or 8 times the original amount). Column 9, lines 30-65 and column 4, lines 30-40.

Claims 68 and 69: During electroless deposition the electrolyte can be buffered to a range of 4.3 to 5.2 using an alkaline buffering agent. Column 3, lines 35-40 and column 4, lines 10-30.

Harbulak teaches all the features of these claims except (1) the exact deposition rate of nickel using nickel acetate (claim 48), (2) the exact initial concentration of the nickel metal base salt in mol/liter (claim 48), (3) the exact number of throughputs provided by the bath (claim 48), (4) the exact materials for the makeup solutions (claims 52, 53), (5) the exact amount of complexing agent used (claim 61), (6) the exact throughput in g/l (claim 66), (7) the self regulating bath pH (claim 48), (8) providing the nickel layer with internal compressive stress (claim 48) and in the claimed range (claims 68,69).

'134 teaches a method for electroless deposition of nickel layers. Page 2, lines 10-25. Deposition can be from an electrolyte solution comprising a nickel metal base salt, a reducing agent, a complexing agent, an accelerator and a stabilizer. Page 2, lines 25-65 and page 3, lines 50-60. '134 teaches that uniform metal layers can be deposited at a steady high deposition rate of 8.89 micrometer/hour, for example. Page 4, lines 30-36 and 85-90 (0.35 mil/hr = 8.89 micrometer/hour). The throughput can be 15-20 MTO, for example 15 MTO. Page 4, lines 35-40 and 100-105. '134 teaches that the nickel metal base salt of the electrolyte can be a nickel metal salt whose anions are volatile (nickel acetate). Page 2, lines 90-95. The initial concentration of metal ions can be 0.119 mol/L, with the specification teaching providing maintaining the concentration at 0.0935 and

0.153 mol/L, preferably approx. 0.119 mol/L, for example. Page 2, lines 110-115 and page 4, lines 79-90. The pH of the bath is desirably fairly constant at 4.5 to 4.7. Page 2, lines 115-125. The complexing agent is described as a glutamic acid or its water soluble salts. Page 2, lines 25-40. While the claim refers to other "optionally" provided components, these are not required to be present. The metal salt can be nickel acetate. Page 2, lines 90-95. A makeup solution is added to the electrolyte while practicing the method. Page 3, lines 95-110. The makeup solution can include reducing agent and an alkaline buffered complexing agent. Page 3, lines 105-130 and page 4, lines 1-20. '134 also provides the use of accelerators in the bath. Page 2, lines 55-65. Makeup solutions will be needed to be added from time to time and thus first and second makeup solutions will be added. Page 3, lines 95-105. The reducing agent can be sodium hypophosphite. Page 2, lines 50-55. The concentration of complexing agent ions is at least twice that of the nickel ions, and the nickel ions can be at 0.079 to 0.189 mol/L (In example 1, 0.321 mol/L of complexing ions is provided by 60 g/L of monosodium glutamate monohydrate). Page 2, lines 60-70 and page 4, lines 75-75.

Parker teaches that when electrolessly plating a metal substrate with a nickel-phosphorous plating, it is desirable to provide an internal compressive stress in the plating so as to improve the adhesion of the coating to the metal substrate. Column 1, lines 1-10, column 2, line 55 through column 3, lines 15. Parker further teaches that this stress can be controlled by varying the phosphorous content of the coating. Column 3, lines 5-15. The coating bath used in the examples can contain nickel ions, sodium

hypophosphite, lactic acid, exaltants, stablizers, etc. and be buffered to a pH of 3.5 to 7. Column 4, lines 20-60. Phosphorous amounts can be varied by adjusting the pH of the bath and the temperature of the bath. Column 6, lines 1-30. Compressive stress (negative stress) is desirably produced. See Table 1, column 8.

It is the Examiner's position that it is well known in the art of electroless plating to provide buffering agents in order to make a bath self regulating in pH. As applicant has not traversed this position from the June 22, 2007 Office Action, it is understood to be admitted prior art.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) modify Harbulak to optimize the deposition rate when using nickel acetate by routine experimentation, which would result in deposition in the claimed range, as Harbulak teaches that deposition rates that can be in claimed range (Example 3) and that the deposition rate can be optimized by varying conditions of the plating (see Example 1). Since, as discussed in MPEP 2144.05, "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955), it would have been obvious to one of ordinary skill in the art to optimize the deposition rates, which are shown to be a result-effective variable by Harbulak. (2) It would further have been obvious to modify Harbulak to optimize the initial concentration of the nickel metal base salt by routine experimentation to give the desired amount of nickel initially provided in the bath, given that Harbulak teaches

a range of desirable nickel ion amounts, and specific compound salts desirable to use for the nickel metal base salt, and therefore the amount of nickel metal base salt would be a result effective variable proportional to the amount of nickel and, as discussed in MPEP 2144.05, "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). (4) It would further have been obvious to modify Harbulak to provide the same materials in the replenishing makeup solutions as in the original bath, which would include the reducing agent, accelerator, alkaline buffer, stabilizer and complexing agent, in order to provide a replenished bath that mimics the conditions of the originally bath, because Harbulak teaches to replenish the bath and all of these materials in the original bath. This would be true for the "first" and "second" makeup solutions since multiple replenishment would be needed for the multiple turnovers. (5) It would further have been obvious to modify Harbulak to optimize the exact amount of the complexing agent used in the plating solution by routine experimentation, which would result in g/L concentration of the complexing agent in the same range as claimed, because Harbulak teaches a range overlapping that claimed and "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976)". (6) It would further have been obvious to modify Harbulak to optimize the throughput amount of the nickel in g/L used in the plating solution by routine experimentation,

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which would result in g/L nickel throughput in the same range as claimed, because Harbulak teaches amounts of nickel used that, when replenished as described, overlaps with that claimed (1-15 g/l x 8 replenishments, gives a range of 8-120 g/l), and "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976)". (7) It would further have been obvious to modify Harbulak to buffer the solution to a self-regulating pH of between 4.3 and 5.2, for example, with an expectation of providing a desirably stable and easy to use bath for plating, because Harbulak teaches a nickel electroless plating bath with a desirable pH range of 4.3 to 5.2 (which is entirely within the range claimed by applicant) and to provide buffering agents in the bath and control it to a desired pH, and furthermore, it is well known that buffering agents are used to desirably make an electroless bath self regulating, and thus, do not need constant monitoring. (3) As to the exact number of throughputs provided by the bath, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Harbulak to optimize the amount of turnovers that can be provided as suggested by '134 to provide a desirable reuse of the bath, as Harbulak teaches that more than 8 bath turnovers can be provided, and does not provide an upper limit, and '134 teaches that a desirable range of metal turnovers when plating nickel with an electroless bath that includes a nickel metal base salt, reducing agent, complexing agent, accelerator and stabilizer is 15-20 times and therefore, since, as discussed in MPEP 2144.05, "[W]here the general conditions of a claim are disclosed in

the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955), it would have been obvious to one of ordinary skill in the art to optimize the turnover amounts, which are shown to be a result-effective variable by Harbulak and '134. (8) It further would have been obvious to modify Harbulak in view of '134 to control bath conditions to apply the nickel plating layer with internal compressive stress as suggested by Parker in order to provide desirable increased adhesion to the substrate, as Harbulak in view of '134 teach to provide nickel electroless plating with phosphorous, and Parker teaches that when providing nickel electroless plating with phosphorous, the plating can desirably be performed to provide compressive stress in the plating so that increased adhesion to the substrate is provided. As to the specific compressive stress of the nickel layer (of claims 68 and 69), the Examiner notes, firstly that the claims do not require the pH to be in the listed ranges, and therefore, when the pH is outside the range the compressive stress can be any amount, which would read of the general suggestion of providing compressive stress. Moreover, even as to the specific stress at the specific pH claimed, Parker provides numerous examples of testing to provide what the stress would be under varied conditions (see Table 1, for example), and one of ordinary skill in the art would desire to determine the optimum range and conditions given the teaching of testing, since, as discussed in MPEP 2144.05, “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to

discover the optimum or workable ranges by routine experimentation.” In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

6. Claim 67 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harbulak in view of ‘134 and Parker as applied to claims 48, 49, 52, 53, 59, 61, 66, 68 and 69 above, and further in view of GB 2 231 063 A (hereinafter ‘063).

Harbulak in view of ‘134 and Parker teach all the features of this claim except the use of a sulfur containing heterocycle as the accelerator.

‘063 teaches the desirable addition of sodium saccharin (also known as saccharine), as sulfur containing heterocycle, to electroless nickel plating baths to enable nickel to be deposited through the bath life and to allow the deposited nickel phosphorous alloy to be subsequently blackened uniformly. Page 2, and pages 3-4.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Harbulak in view of ‘134 and Parker to further add sodium saccharin to the plating bath as suggested by '063 for the benefits of allowing nickel to be deposited through the bath life and to allow the deposited nickel phosphorous alloy to be subsequently blackened uniformly, since Harbulak in view of ‘134 and Parker provides an electroless nickel plating bath system to deposit nickel phosphorous coatings, and '063 teaches that the further addition of sodium saccharin to such baths provides the benefits of allowing nickel to be deposited through the bath life and to allow the deposited nickel phosphorous alloy to be subsequently blackened

uniformly. While '063 does not specifically teach that the sodium saccharin acts as an accelerator, since the same material is added to the bath as claimed (the sulfur containing heterocycle, described by applicant in the specification as being preferably sodium saccharine, see page 4 of the specification), it would be understood to act in the same way. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

7. The GB 2 231 063 A reference was provided with applicant's IDS statement of March 27, 2008.

Response to Arguments

8. Applicant's arguments with respect to claims 48, 49, 52, 53, 59, 61, 66-69 have been considered but are moot in view of the new ground(s) of rejection.

(A) As to the arguments regarding the 35 USC 103 rejection using '134 as the primary reference, the Examiner notes that the rejection has been withdrawn.

(B) As to the arguments regarding the 35 USC 103 rejections using Harbulak as the primary reference, the Examiner notes the further use of the references to Parker and '063 as discussed above. Parker has been provided as to the suggestion to provide a compressive stress in the plated layer. Furthermore, the Examiner notes that applicant

refers to providing a compressive stress being maintained throughout the MTO, however, this is not required by the claim that merely requires the resulting coating to internal compressive stress. As to Harbulak not disclosing the claimed metal salt stabilizers, the Examiner disagrees. As discussed in the rejection above, Harbulak teaches the option of providing such stabilizers within the claimed range of materials (see column 6, lines 10-20).

As to the selection of materials that are volatile anions, Harbulak teaches that nickel acetate and stabilizers with acetate can be used. As to the specific selection of these materials over other possible materials, applicant appears to be basing their showing of improvement on the 37 CFR 1.132 Declaration of Inventor Stark (May 12, 2008). The Examiner has reviewed this Declaration, however, is of the position that a showing of unexpected benefits commensurate in scope with what is claimed has not been made. Specifically, (1) applicant has compared baths that are drastically different in composition (the comparative baths 1 and 2 for example, along with differences in nickel source, also have large differences in amounts of hypophosphite used, differences in amounts of lactic acid, differences in other acetates, borates, and saccharine and large differences in amount of NaOH used; this is also true of the other comparative baths used). This does show that various baths can provide compressive stress or not, but the Examiner has provided Parker to show that one of ordinary skill in the art would adjust baths to provide compressive stress. The large number of differences between the baths does not provide a comparative showing that the specific

use of nickel acetate in otherwise identical or even similar plating situations is what makes a bath that has desirable compressive stress. (2) Furthermore, the only exemplary metal anion that has been used in the examples is acetate (i.e., nickel acetate), while the claimed invention (claim 48) provides that the anion can be "acetate, formate, nitrate, oxalate, propionate, citrate, ascorbate, and combinations thereof". As discussed in MPEP 716.02(d) the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range, and while nonobviousness of a genus made by supported by data showing unexpected results of a species in certain circumstances, they do not occur here. Inventor Stark makes a blanket statement in paragraph 12 that "volatile anions in the metal ion sources in a critical feature", but no showing is made as to why the very different anions would be expected to be "volatile" (no definition or requirements as to "volatile" is provided) and why volatile anions would be expected to react the same as the single species to acetate, and moreover, given the fact that the comparative baths used are so different from the baths with nickel acetate (as discussed in section (1) above) applicant has not actually made a showing that nickel acetate is better than other anions that can be used.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792